

WE CLAIM:

1. A thin film transistor comprising:
an insulating layer;
a gate electrode;
a structurally ordered semiconductor layer;
a source electrode; and
a drain electrode,

wherein the insulating layer, the gate electrode, the semiconductor layer, the source electrode, and the drain electrode are in any sequence as long as the gate electrode and the semiconductor layer both contact the insulating layer, and the source electrode and the drain electrode both contact the semiconductor layer,

wherein the semiconductor layer is prepared by a process comprising:

creating a composition comprising a liquid and a self-organizable polymer at least partially dissolved in the liquid, resulting in dissolved polymer molecules;

reducing the solubility of the dissolved polymer molecules to induce formation of structurally ordered polymer aggregates in the composition;

depositing a layer of the composition including the structurally ordered polymer aggregates; and

drying at least partially the layer resulting in the structurally ordered semiconductor layer, wherein the structural order of the semiconductor layer increases the charge transport capability of the semiconductor layer.

2. The transistor of claim 1, wherein the reducing the solubility of the dissolved polymer molecules is accomplished by changing the temperature of the liquid phase.

3. The transistor of claim 1, wherein the reducing the solubility of the dissolved polymer molecules is accomplished by adding a different liquid that is less capable of dissolving the polymer than the liquid.

4. The transistor of claim 1, wherein the different liquid is added in an amount ranging from about 1% to about 80% by volume based on the total volume of the liquid and the different liquid.

5. The transistor of claim 1, wherein the polymer is a conjugated polymer.

6. The transistor of claim 1, wherein the polymer is a polythiophene.